

# Claims

- [c1] 1. A method for determining whether a first voice signal is mixed with a low-frequency voice signal; the first voice signal comprising: a plurality of signal data, each datum representing the amplitude of the first voice signal at a different time; the method comprising: setting a standard level and a predetermined period of time; counting the number of times that the amplitude of the first voice signal crosses the standard level in the predetermined period, and outputting a corresponding counting result; and determining whether the voice signal is mixed with the low-frequency voice signal by comparing the counting result with a threshold value.
- [c2] 2.The method of claim 1 wherein determining that the first voice signal is mixed with the low-frequency voice signal according to the counting result when the counting result is smaller than the threshold value.
- [c3] 3.The method of claim 1 wherein determining that the first voice signal is not mixed with the low-frequency voice signal according to the counting result when the

counting result is larger than the threshold value.

- [c4] 4.The method of claim 1 wherein the bandwidth of the low-frequency voice signal is equal to the bandwidth of the first voice signal.
- [c5] 5. The method of claim 1 wherein the counting step comprises comparing whether one of a current datum and a next datum is larger or smaller than the standard level in the predetermined period, wherein a zero-crossing between the current datum and the next datum in the first voice signal is determined when one of the current datum and the next datum is larger than the standard level and other is smaller than the standard level.
- [c6] 6.The method of claim 1 wherein the standard level is a zero level.
- [c7] 7.The method of claim 1 further comprising reducing the amplitude of the low-frequency voice signal in the first voice signal when the first voice signal is determined to be mixed with the low-frequency voice signal.
- [c8] 8.The method of claim 1 further comprising:  
providing a second voice signal comprising a plurality of data, each datum representing the amplitude of the second voice signal at a different time;

counting the number that the amplitude of the second voice signal crosses the standard level in the predetermined period, and outputting a corresponding second counting result; and  
determining whether the second voice signal is mixed with the low-frequency voice signal according to whether the counting result of the first voice signal is larger than the second counting result.

[c9] 9. The method of claim 8 wherein determining whether the second voice signal is mixed with the low-frequency voice signal is performed when the counting result is smaller than the threshold value and the first voice signal is determined to be mixed with the low-frequency voice signal.

[c10] 10. A playing circuit comprising:  
a determining circuit for determining whether a first voice signal is mixed with a low-frequency voice signal, the first voice signal comprising a plurality of signal data, each datum representing the amplitude of the first voice signal at a different time, the determining circuit comprising:  
a detecting module for counting zero-crossings in a predetermined period and outputting a corresponding counting result; and  
a comparing module for determining whether the first

voice signal is mixed with the low-frequency voice signal by comparing the counting result with a threshold value.

- [c11] 11.The playing circuit of claim 1 wherein when the counting result is smaller than the threshold value, the comparing module determines that the first voice signal is mixed with the low-frequency signal.
- [c12] 12.The playing circuit of claim 1 wherein when the counting result is larger than the threshold value, the comparing module determines that the first voice signal is not mixed with the lowfrequency signal.
- [c13] 13.The playing circuit of claim 10 wherein the bandwidth of the low-frequency voice signal is equal to the bandwidth of the first voice signal.
- [c14] 14.The playing circuit of claim 1 wherein the detecting module compares a current datum and a next datum with a standard level, wherein when one of the current datum and the next datum is larger than the standard level and the other of the current datum and the next datum is smaller than the standard level, the detecting module determines that there is a zero-crossing between the current datum and the next datum in the first voice signal.
- [c15] 15.The playing circuit of claim 14 wherein the standard

level is a zero level.

- [c16] 16.The playing circuit of claim 10 further receiving a second voice signal comprising a plurality of data, each datum representing the amplitude of the second voice signal at a different time, and the determining circuit further comprising:  
a second detecting module for counting a number of times that the amplitude of the second voice signal crosses a standard level in the predetermined period, and outputting a corresponding second counting result; wherein the comparing module determines that the first voice signal is mixed with the low-frequency signal when the counting result of the first voice signal is larger than the second counting result.
- [c17] 17.The playing circuit of claim 16 wherein the determining module determines that the first voice signal is mixed with the low-frequency signal when the counting result is smaller than the second counting result.
- [c18] 18.The playing circuit of claim 16 further comprising a speaker for comparing the result determined by the comparing module and transforming the second voice signal into sound.
- [c19] 19.The playing circuit of claim 10 further comprising a

receiving circuit to generate the first voice signal.

[c20] 20. The playing circuit of claim 19 wherein the receiving circuit is capable of reading the first voice signal from a video disc.